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Preface

This report provides the livestock auction market industry with information on a computer program that could be helpful in increasing the efficiency of auction market sales data operations.

The authors acknowledge the cooperation and assistance of the management and staff of the Central Missouri Livestock Auction, Mexico, Mo. The computer system was installed and was tested on this market under the terms of a Memorandum of Understanding with the former Transportation and Facilities Research Division.

This work was done under a cooperative agreement between the former Transportation and Facilities Research Division, Agricultural Research Service (ARS), U.S. Department of Agriculture and the Computer Services Center, University of Missouri. The research was conducted under the general supervision of Tarvin F. Webb, Livestock and Meat Marketing Laboratory, Agricultural Marketing Research Institute, ARS, and Leon L. Johnson, Assistant Director, Computer Services Center, University of Missouri.

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AUTOMATING SALES DATA ON LIVESTOCK AUCTION MARKETS

H. F. Mayes, L. L. Johnson, and T. F. Webb¹, 1922-1

Summary

Where clerical work accounts for nearly 30 percent of the direct labor costs, computer processing of sales data has proven feasible at the market location.² A program to process sales data on a livestock auction market has been converted to COBOL (Common Business Oriented Language) from computer machine language.

The complete COBOL program listing developed under this project is available from the author as an aid to livestock auction market managers for programmers when considering computer processing of sales data. The program is flexible, and it can be used with computer systems that have a COBOL compiler.

For examples of similar information printed out by

this program, see "Computer Processing of Sales Data on a Livestock Auction Market," Marketing Research Report, No. 980, pages 10-14.

Conversion of the original machine language program to COBOL makes the program easier to adapt to other markets. It also allows a market to lease time on a larger computer system which would have a COBOL compiler. Markets having only two or three sales days per week might not be able to afford the cost of leasing a small computer for their offices. They could, however, lease time on a larger computer system by leasing suitable input and output devices to be installed in the market offices. This would permit them to use a computer system to process sales information and other market records.

Background

The preparation of sales documents and related recordkeeping operations is becoming a bigger task on livestock markets each year. The costs of preparing these sales documents and related records have risen to approximately 30 percent of the total labor costs.

More detailed records are being required by State and Federal agencies over what was required a few years ago and today. Volume of livestock handled by some markets has increased. The combination of additional records and increased volume has resulted in the need for some type of data handling system in many markets.

To fill this need, research was initiated to determine the feasibility of using computers to process sales data on livestock markets. This is the second of

two reports resulting from this research. The first report² deals with a computer program written in machine language designed to fit a specific co-operating market. The program covers the preparation of sellers' invoices and checks, buyers' statements, truckers' checks, and the end of the sales day summary. These machine language programs were not readily adaptable to other markets. A trained computer programmer was needed to make the necessary changes in the programs. These changes would be due to different yardage and commission fees, different selling practices, and location of information on scale tickets, sellers' invoices, or buyers' statements.

Because the machine language program was rather difficult to change to fit other markets, a need for a more easily understood program existed. Investigation of the different types of programs being used on computers revealed that a program written in business-type language would be more readily understood by nontechnically trained people. It seemed most feasible to write the program in COBOL, which was accomplished at the Computational Services Center, University of Missouri, Columbia.

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²Mayes, H. F., Johnson, L. L., and Webb, T. F. Computer Processing of Sales Data on a Livestock Auction Market. U.S. Dept. of Agr., Mktg. Res. Rpt. No. 980, 20 pp., illus. 1973.

Automated Data Recording

Data collection and recording is of much concern to livestock market managers. Early attempts at using data processing equipment required the recording by hand of the initial sales data at the sales ring. These documents were forwarded to the office where this information was transcribed to another document for processing. The transcribing resulted in many errors.

Sales data can be recorded by hand on a standard punch card, $3\frac{1}{4}$ by $7\frac{3}{8}$ inch in size. These cards can be fed into a card punch machine where the hand-recorded information is punched into the card. The information can then be verified in a punched-card verifier. This procedure was followed in the original computer project in processing data on scale tickets. The scale tickets had originated in the sales ring with the weight information stamped or punched and the other sales data recorded by hand.

Consideration was given to using a device to record sales data in the auction arena. It became apparent that the time available for the recording device to complete one sale cycle was a critical factor. Timing of the selling operation at the Central Missouri Livestock Auction indicated that an average minimum sale for one draft was 14 seconds. The average maximum sale was about 2 minutes. A data recording device had to complete one sale cycle in 14 seconds or less.

A data recording device must be capable of operating close to the speed of the sale if the ring clerk is to keep up. Otherwise, the ring clerk will be behind the auctioneer. If this occurs, the ring clerk tries to slow down the sale to record sales data. The auctioneer tries to keep the auction moving as rapidly as possible in the belief that this obtains a better price for the livestock.

During the development of the COBOL program, equipment for recording sales information at the sales ring was investigated. A requirement was that the equipment must be capable of punching the sales data into punch cards, and the cards could then be transferred to the office where they would be read directly into the computer.

To do this job a Standard Register Source Record punch was installed to record the sales information at the sales ring. The number of head in a sales draft and the total weight of the draft are automatically

punched. The rest of the sales data is entered in two machine cycles as follows:

First cycle: An animal description, number of pair (cow-calf, ewe-lamb, etc.), head sales indicator, and seller number.

Second cycle: The sale price, the buyer number, and the buyer pen number.

In the research an electronic scale was used by the market to weigh livestock. The scale platform also served as the sales ring. These electronic scales have the capability of digitized output signals that can be fed directly to such data recording machines as the Standard Register Source Record punch. This direct input was faster than manual input of the information. When livestock entered the sales ring (scale platform), the clerk punched the number of head into the control punch for the scales. The livestock were automatically weighed, and the total weight and the number of head transmitted to the recording equipment.

This equipment worked well for recording sales data. However, there were two problems to be solved. First, noise generated by the punch tended to distract the auctioneer and other personnel in the sales booth. In tests at the Central Missouri Livestock Auction, the punch was located next to the auctioneer. A cover for the punch may reduce the noise, or perhaps the sales booth could be redesigned to locate the punch further from the sales personnel.

The second problem involved the capability of correcting a card which has been improperly punched. If an error occurred in punching during the second machine cycle, the replacement card would start over and go through both machine cycles. The number of head and weight information would be punched in the office on a regular key punch machine. The normal procedure in the case of an error was to mark the correct information on the card by hand. The replacement card was then prepared in the office.

Several machines that can punch cards at the source of the generated data are now available. Markets considering installation of a card punch should investigate thoroughly before purchase to assure that they are getting the best available equipment for their needs.

Data Transmission

An important consideration in operating a live-stock market is the transmission of data from the sales area to the office. This can be accomplished in several ways. Basic of these is voice communication, which can be accomplished by installing telephone(s) or an intercom or both.

Another way to transmit data is physically transporting sales information from the sales ring to the general office. This system must be well planned to avoid unnecessary delays in processing invoices and checks, and it is important to every market, regardless of the methods used to process the information. One of the most popular ways of transporting sales documents is the pneumatic conveyor. Other methods include transporting by hand, multilane or multi-

level conveyors, and in some cases, by electronic transmission.

The more sophisticated way, electronic transmission, is becoming more important with the acceptance of computer processing. The leasing of computer time on a large computer system may be possible. Most of the large computer systems are equipped with a COBOL compiler. Leasing of computer time on a large computer system often requires electronic transmission of sales data over local telephone lines and sometimes leased wires. A livestock market would use an input and output device or a combination input-output device in its office. Some devices that are easily adapted to the format of livestock sales may be on the market now or in the near future.

Card Format

The card formats designed for use with these COBOL programs have been abbreviated as much as possible to reduce data input requirements. Fields containing similar information are located in the same relative columns on the different types of cards. This allows the use of mechanical sorters to extract similar information, and simplifies the data recording operations by having fewer formats to learn. The card formats in this program are Check-In, Special Charge, Draft, and Utility.

Check-in Card

In this system, the check-in card opens a seller's account and provides the number of head of livestock checked into the market for sale and other pertinent items which are self-explanatory.

Column 1

The letter "C" to indicate type of card.

Column 2-5

Four-digit seller number.

Column 6-9

Four-digit time of day, 12-hour time system.

Column 10

Letter "A" for a.m. or letter "P" for p.m.

Column 11-15

Five-digit ticket number from source document.

Column 16-21

Six-digit date of arrival (month, day, year).

Column 22-24

Three-digit number of head received.

Column 25

Letter "M" if no meatboard is to be charged. Left

blank if chargeable.

Column 26

Letter "I" if no inspection charge.

Column 27-74

Name and address field for seller. This field is free form with each line of name and address separated by a "/".

Column 75-80

Six-digit sequence number. These numbers should be prepunched in the card by the supplier.

Special Charge Card

Column 1

The letter "S" to indicate type of card.

Column 2-5

Four-digit seller number.

Column 6-9

Four-digit buyer number.

Column 10

Type rate calculation, letter "H" for by the head, letter "W" for by the hundredweight, letter "F" for flat rate.

Column 11-15

Five-digit price field. Dollars and cents.

Column 16-21

Numerical code for the type of special charge:

1 = Advance payment to seller.

2 = Commission paid to buyer.

3 = Feed charge either buyer or seller.

4 = Reduce number of animals checked in.

- 5 = Trucking charge either buyer or seller.
- 6 = Veterinary charge either buyer or seller.

Column 22-24

Three-digit number of head.

Column 25-26

Two-digit number of days to be multiplied times amount of charge.

Column 27-74

This name and address field is used to record payee name on checks generated from this card and issued by the system.

Column 75-80

Six-digit sequence number. These numbers should be prepunched in the card by the supplier.

Draft Card

Column 1

The letter "D" to indicate the type of card.

Column 2-5

Four-digit seller number.

Column 6-9

Four-digit buyer number.

Column 10

Sale rate indicator, letter "H" for sale by the head, letter "F" for sale at flat rate, letter "W" for sale by the hundredweight. Sale by weight assumed if column is left blank.

Column 11-15

Five-digit price field. Dollars and cents, right justified.

Column 16-18

Animal description code. Each column can contain a code number from 1 to 9. These three-letter descriptions can be defined any way the user desires. These are defined between statements 0235 and 0321.

Column 22-24

Three digits to represent number of head sold this draft.

Column 25-26

Two digits to represent number of mother and offspring combinations (pairs).

Column 27

Sex of animals sold.

Column 28-32

Five-digit total weight of this draft.

Column 33-36

Four-digit buyer pen number which is printed as it is punched.

Column 37-38

Class indication if later analysis is desired for market reporting.

Column 39-74

Available for future use.

Column 25-80

Six-digit sequence number. These numbers should be prepunched in the card by the supplier.

Utility Card

Column 1

The letter "U" to indicate the type of card.

Column 2-5

Four-digit seller number.

Column 6-9

Four-digit seller number.

Column 10

Rate calculation indicator. Letter "H" for by the head, letter "W" for by the hundredweight, letter "F" for a flat rate.

Column 11-15

An indicator of a proportional split when more than one seller owns a particular lot of live-stock. Column 13 contains a "/" mark which divides a numerator and denominator.

Column 16

Indicator for type of operation requested. Code is a numeric digit from 1-9:

1 = Request to close an account.

2 = Data.

3 = Request to print all open accounts. Will not close any accounts.

4 = Request to exchange a draft from one buyer to another or from one seller to another.

5 = Request to list the content of a selected account. Will not close the account. Will list a closed account if requested.

6 = Request to add another name to account.

7 = Request to pull or delete an entry from an account.

8 = Request to open an account which was previously closed. This allows additional entries or deletion within this account. No changes are allowed for a closed account.

9 = Available for future use.

Column 22-24

Three-digit head count to be effected.

Column 27-74

Name and address field. This field is free form with each line of name and address separated by a "/".

Column 75-80

Six-digit sequence number. These numbers should be prepunched in the card by the supplier.

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